Policy brief
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International Growth Centre

Marketing Weather-Indexed Agricultural Insurance to Smallholder Farmers in rural Gujarat, India

In brief

- Almost 65% of the Indian agricultural sector depend on monsoons, leading to income and consumption variability.
- Despite the theoretical benefits of index-based weather insurance (farmers are paid when rain exceeds or falls below pre-determined triggers), take-up is suprisingly low.
- This study investigates the effectiveness of index-based rainfall insurance as a tool to help farmers manage risk and identifies factors that limit or facilitate adoption.
- Key results:
  - **Pricing matters**: A price reduction of 10% increases demand by 10.4%-11.6%.
  - **Individual trust in the insurance provider is important**: as insurance requires an up-front payment by a customer in order to obtain a future claim.
  - **Financial education can increase adoption**: A 2009 study shows financial education can have a positive and significant effect on rainfall insurance adoption.
  - **Diversifying weather risk induces farmers to shift to high-return cash crops**: The treatment group had a 13% higher likelihood of shifting to high-return crops.
  - **Policy design is improving**: through dynamic start dates, payouts based on cumulative rainfall and sensitivity of the phase design to local cropping cycles.

The International Growth Centre provided partial funding for this long-term evaluation of weather insurance, namely funding for marketing activities during the 2012 Kharif season

Policy Motivation

"Traditional informal risk-coping mechanisms that help insure against idiosyncratic risks do not work well with covariate risks like drought and flood"

Despite gradual improvements in irrigation, almost 65% of the Indian agricultural sector still depends on erratic and unpredictable monsoons. High variability in income and consumption results, especially because rainfall risk co-varies among households that live near each other. Traditional informal risk-coping mechanisms that help insure against idiosyncratic risks do not work well with covariate risks like drought and flood.

Index-based weather insurance is an innovative financial instrument, which can be used by farmers to hedge against erratic monsoons. Such a product pays farmers when rainfall exceeds or falls below pre-determined triggers, which are based on historic rainfall data as well as crop and soil considerations. Despite theoretical advantages of index-based rainfall insurance, take-up as a standalone product has remained surprisingly low among smallholder farmers.[1]

In the project "Index Insurance to Manage Weather Risks: A Long-Term Experiment" we investigate the effectiveness of rainfall insurance as a tool to help farmers manage risk. The research also examines whether farmers purchase the optimal amount of risk coverage and attempts to identify the factors, which limit or facilitate adoption of new financial products.

Policy Impact

This study seeks to provide evidence on the impact index-based insurance has on agricultural decision-making and household well-being. Additionally the study aims to explore the underlying demand for index-based weather insurance, as well as constraints to take-up, through various experimental marketing treatments. This research informs national policy makers about the impact of weather insurance initiatives and provides practitioners with evidence about 'best practices' for marketing, distribution, insurance education, and product design.

Audience

"The research also... attempts to identify the factors, which limit or facilitate adoption of new financial products"

Research findings from this study will be shared with government organizations such as the Agricultural Insurance Company of India and NABARD to inform their decisions regarding the expansion or support of various weather insurance initiatives. Findings will also be shared with NGOs and international and Indian-based policy organizations to inform outreach and policy agendas, particularly in the areas of improving access to financial services and supporting rural livelihoods.

1. Index insurance has enjoyed wider adoption when offered, as an alternative to area-based yield insurance, to farmers taking out government loans, who are required to purchase insurance.

Policy Implications

Pricing matters

Researchers have found that rainfall insurance demand is highly price-sensitive, suggesting that high insurance prices continue to contribute to low demand. Specifically, research in Gujarat indicates that a price reduction of 10 percent increases demand by 10.4 to 11.6 percent. These estimates imply that rainfall insurance demand would increase by approximately 36-66% if the product could be offered at an actuarially fair price. Even with this dramatic increase, take-up amongst the study population would still be low given current take-up rates. We do expect loading to decrease as product development costs are spread over more policies, payment technologies fall in cost, and rainfall data improves.

"These estimates imply that rainfall insurance demand would increase by approximately 36-66% if the product could be offered at an actuarially fair price"

Individual trust in the insurance provider is important

Insurance requires an up-front payment by a customer in order to obtain a state-contingent—uncertain—claim that would pay out in the future. Trust in the insurer is therefore an important consideration in a customer's decision to purchase insurance. In addition, insurance is complicated, and trust also increases confidence in the fairness and usefulness of a policy. Some of our earlier results in Andhra Pradesh indicate that an endorsement from the prominent local NGO BASIX significantly increases rainfall insurance take-up. Importantly, this effect holds only among households already familiar with BASIX. For this sub-group, the endorsement from BASIX increased the insurance purchase probability by 10.1 percentage points, or 36 percent of the average take-up rate. This evidence suggests that established firms and NGOs can better accomplish enhanced micro-insurance coverage by building on their existing reputations, while entirely new organizations and brands will find it far more difficult.

Financial education can increase adoption

Findings from a financial literacy and weather insurance marketing field experiment conducted in 2009 indicate that financial education can have a positive and significant effect on rainfall insurance adoption. Utilizing a village-level financial literacy training module that combined training videos, interactive simulation games and general lessons in personal financial management, we found that attending the village level financial training doubled take-up of the insurance product (an increase of 8 percentage points). The relatively low baseline take-up rates meant that the education modules probably were not cost-effective in the experiment. Modest increases in scale, efficiency of delivery, and persistence of the treatment effects could allow sales-based commissions to cover the costs of the financial education module.

Diversifying weather risk induces farmers to shift to high-return cash crops

"Rural farmers with limited education may nimbly respond to a risk reduction by changing their farming practices."

Cole, Giné & Vickery (2012) report that provision of rainfall insurance causes smallholder farmers in Andhra Pradesh to substitute high-return but high-risk cash crops for low- return low-risk staples, consistent with theoretical predictions. Smallholders in the treatment group had a 13% higher likelihood of making such a shift compared with the control group. This effect is economically consequential; since it shows that rural farmers with limited education may nimbly respond to a

risk reduction by changing their farming practices. While these results relate that financial innovations, especially rainfall insurance, can influence the real-world decisions of poor farmers, they also suggest that undiversified rainfall risk may be an important constraint on agricultural development.

Policy design is improving

Because it is not based on actual loss, but rather the amount of rainfall measured, index insurance does not suffer from information problems such as adverse selection or moral hazard. However, the use of an index introduces basis risk— there may not be a perfect correlation between the loss implied by the rainfall gauge, and the loss experienced by the farmer.

"Further improvements would include reducing the geographic coverage of policies."

This risk may be addressed in a number of ways: by concentrating policy payouts on catastrophic states of the world (e.g., very little rainfall), basis risk is reduced, as severe droughts are very likely to adversely affect crop yields. However, this approach must be balanced against the need to establish trust in the product, which may require more frequent payouts.

Early work on optimal policy design suggests that dynamic start dates provide greater, and more consistent, coverage than static start dates; and that basing payouts on cumulative rainfall, as opposed to continuous rainfall days, is preferable.

Additionally, the sensitivity of the phase design to local cropping cycles appears to really matter in the performance of the product.

Further improvements would include reducing the geographic coverage of policies (for example village-based policies), through either automated weather stations, or satellite-based measurements of crop yields.

Implementation

The project "Index Insurance to Manage Weather Risks: A Long-Run Experiment" is run in close collaboration with the Self-Employed Women's Association (SEWA) and the Centre for Micro Finance (CMF). In 2006, SEWA and the CMF research team began a partnership to introduce and evaluate rainfall insurance using SEWA's grassroots network of community workers.

In the past, SEWA has distributed rainfall insurance underwritten by the private sector firms IFFCO-TOKIO and ICICI Lombard. More recently, SEWA has chosen products underwritten by the public sector Agricultural Insurance Company of India (AIC), which writes insurance policies based on highly localized weather information collected by the Gujarat State Disaster Management Authority (GSDMA).

The study sample, drawn from SEWA members, is broadly representative of landless laborers and small-scale farmers in Gujarat. The median farm size in our sample is two acres, including sharecropped, rented or pawned land. All SEWA members are women.

Dissemination

The research from this study should be shared with government officials in India and policy makers based within India and globally. Specific organizations which we feel could benefit from the research findings include:

1. International Food Policy Research Institute (IFPRI), South Asia – Dr. P.K. Joshi, Director (p.joshi@ cgiar.org)
2. Micro-Insurance Academy – Dr. Nihar Jangle, Project Leader (nihar@mia.org.in)
3. Climate Change Agriculture and Food Security (CCAFS) – Pramod Kumar Aggarwal, Regional Program Leader (p.k.aggarwal@cgiar.org)
4. Agricultural Insurance Company of India, Ltd – Kolli Rao, Deputy General Manager (knrao@aicofindia.com)
5. NABARD, Gujarat office –H. R. Dave, Chief General Manager (ahmedabad@nabard.org) Ministry of Finance, India – Mr. Arvind Kumar, Joint Secretary (Pensions & Insurance) (jsins-dfs@nic.in).

Further Reading

S. Gaurav, S. Cole, J. Tobacman (2011) "Marketing Complex Financial Products in Emerging Markets: Evidence from Rainfall Insurance in India" Journal of Marketing Research: Vol. 48, Special Issue, pp. S150-S162.

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About the authors

Shawn Cole is an Associate Professor in the Finance Unit at Harvard Business School. His research examines corporate and household finance in emerging markets, with a focus on banking, microfinance, insurance, and the relationship between financial development and economic growth. He has worked in India, the Philippines, Indonesia, Vietnam, and South Africa.

Maulik Jagnani holds a Masters Degree in Economics from Tufts University. His graduate thesis was an impact evaluation study of SEBI's policy interventions in Indian Equity Markets between 2007 – 2011. His interests mainly lie in Empirical Micro-econometrics, Behavioral Economics and Development Economics. Maulik joined CMF in Decemeber 2012 as a Research Associate on the Index-based Weather Insurance project based out of Gujarat.

Lisa Nestor is a MBA student at University of California – Los Angeles.

Jeremy Tobacman is an Assistant Professor at the Wharton School of the University of Pennsylvania in the Department of Business Economics and Public Policy. He studies behavioral economics and household finance, with a focus on low-income households. One of Jeremy's major continuing project analyzes the design, adoption, and consequences of a retail rainfall insurance product in India. Jeremy is an NBER Faculty Research Fellow, and previously he was a Postdoctoral Research Fellow at the Department of Economics and Nuffield College, University of Oxford. He earned his Ph.D. in Economics from Harvard University.

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